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ENVIRONMENTAL PROTECTION AGENCY

[EPA-R09-OAR-2019-0472; FRL-9998-27-Region 9]

**Official Release of EMFAC2017 Motor Vehicle Emission Factor
Model for Use in the State of California**

AGENCY: Environmental Protection Agency (EPA).

ACTION: Notice of Availability.

SUMMARY: The Environmental Protection Agency (EPA) is approving and announcing the availability of the latest version of the California EMFAC (short for EMISSION FACTOR) model for use in state implementation plan (SIP) development and transportation conformity in California. EMFAC2017 is the latest update to the EMFAC model for use by California state and local governments to meet Clean Air Act (CAA) requirements. The new model, which is based on new and improved data, calculates air pollution emissions factors for passenger cars, trucks, motorcycles, motor homes and buses. Today's notice also sets the date after which EMFAC2017, rather than EMFAC2014, must be used to satisfy the requirement that conformity determinations be based on the latest emissions model available. This requirement can be met by using the most current version of the motor vehicle emissions model approved by the EPA. Since the EMFAC model is used only in California, the EPA's approval and the announcement of the

availability of the model does not affect the applicability of the Motor Vehicle Emissions Simulator (MOVES) model for users in other states.

DATES: The EPA's approval of the EMFAC2017 emissions model for SIP and conformity purposes is effective [**INSERT DATE OF PUBLICATION IN THE *FEDERAL REGISTER***]. EMFAC2017 must be used as described in this Notice for all new regional emissions analyses for transportation conformity purposes that are started on or after August 16, 2021 and for all new carbon monoxide (CO) and particulate matter (PM₁₀ and PM_{2.5}) hot-spot analyses that are started on or after August 17, 2020.

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SUPPLEMENTARY INFORMATION: Copies of the official version of the EMFAC2017 model, including technical support documents, are available on the California Air Resources Board (CARB) web site: http://www.arb.ca.gov/msei/categories.htm#onroad_motor_vehicles.

Throughout this document, "we," "us," and "our" refer to the EPA.

I. Background

A. What Is the EMFAC Model?

The EMFAC model is a computer model that can estimate emissions rates for on-road mobile sources ("motor vehicles") for calendar years 2000 to 2050 operating in California. Pollutant emissions for hydrocarbons (HC), CO, nitrogen oxides (NO_x), PM₁₀, PM_{2.5}, carbon dioxide (CO₂), and sulfur oxides are output from the model. Emissions are calculated for over forty different vehicle classes composed of passenger cars, various types of trucks and buses, motorcycles, and motor homes.

EMFAC is used to calculate current and future inventories of motor vehicle emissions at the state, air district, air basin, county, or project level. EMFAC contains default vehicle activity data, and the option of modifying that data, so it can be used to estimate a motor vehicle emissions inventory in tons per day for a specific year, month, or season, and as a function of ambient temperature, relative humidity, vehicle population, mileage accrual, miles of travel and speeds. Thus, the model can be used to make decisions about air pollution policies and programs at the local or state level.

Inventories based on EMFAC are also used to meet the SIP and transportation conformity requirements under the CAA. Transportation conformity is required under CAA section 176(c) to ensure that federally supported transportation plans, transportation improvement programs (TIPs), and highway and

transit projects are consistent with ("conform to") the purpose of the SIP. Conformity to a SIP means that a transportation activity will not cause or contribute to new air quality violations, worsen existing violations, or delay timely attainment of the national ambient air quality standards (NAAQS) or interim milestones. The EPA's transportation conformity regulations (40 CFR Parts 51.390 and 93) describe how federally funded and approved highway and transit projects meet these statutory requirements. EMFAC is used statewide in all regional emissions analyses and CO, PM₁₀ and PM_{2.5} hot-spot analyses for transportation conformity determinations in California.

B. What Versions of EMFAC Are Currently in Use in California?

Most SIPs in California were developed using EMFAC2014 (released by CARB in December 2014) or EMFAC2011 (released by CARB in September 2011). The EPA approved and announced the availability of EMFAC2014 on December 14, 2015 (80 FR 77337) and approved and announced the availability of EMFAC2011 on March 16, 2013 (78 FR 14533) for all nonattainment and maintenance areas in California.

EMFAC2014 was considered a major update to previous versions of EMFAC and most SIPs in California were updated with EMFAC2014 in the 2015-2018 timeframe. EMFAC2014 included a new model structure, new data and methodologies regarding

calculation of motor vehicle emissions, and revisions to implementation data for control measures.

C. Why Is the EPA Announcing Its Approval of the EMFAC Model?

CAA section 172(c)(3) and 40 CFR 51.114(a) require that SIP inventories be based on the most current, accurate, and applicable models that are available at the time the SIP is developed. CAA section 176(c)(1) and 40 CFR 93.111(a) require that the latest emissions estimates be used in conformity analyses. The EPA approves models that fulfill these requirements.

Under 40 CFR 93.111(a), the EPA must approve new versions of EMFAC for SIP purposes before they can be used in transportation conformity analyses. In a July 20, 2018 letter, CARB requested that the EPA approve EMFAC2017 for use in developing SIPs and in determining conformity in California.¹ As described further below, EMFAC2017 is a significant change from previous EMFAC models and can calculate motor vehicle emissions for all areas in California. EMFAC2017 is being approved as the latest emissions model for statewide use in SIP development and

¹ The EMFAC2017 model and supporting information is available for downloading at http://www.arb.ca.gov/msei/categories.htm#onroad_motor_vehicles. Technical documentation explaining the changes to the model and the technical foundations for the model is available at <https://ww3.arb.ca.gov/msei/downloads/emfac2017-volume-iii-technical-documentation.pdf>.

emissions analyses for conformity purposes. Because the EMFAC model is only used in California, the EPA's statewide approval of the model does not affect the applicability of the MOVES emissions factor model for users in other states.

II. EPA Action

A. What Version of EMFAC Is the EPA Approving?

In this notice, the EPA is approving and announcing that EMFAC2017 is available to use in statewide California SIP development and for regional emissions analyses, and CO, PM₁₀ and PM_{2.5} hot-spot analyses for transportation conformity. EMFAC2017 was developed by CARB and transmitted for approval to the EPA on July 20, 2018.²

The EMFAC2017 model uses the same structure, using Python and MySQL software, as EMFAC2014. This structure was developed to allow CARB to incorporate updated regulations and emissions data into the model and provide for a simplified user experience. The model is operated in either the Emissions Mode or the Emissions Rate Mode for regional emissions analyses to access emissions databases and vehicle activity data for the appropriate geographic subarea. EMFAC2017 also includes the Project-Level Assessment (EMFAC2017-PL) feature, which is

² EMFAC2017, v1.0.2 (March 1, 2018 release).

available when EMFAC2017 is run in Emissions Rate Mode. The design of this part of EMFAC has not significantly changed from EMFAC2014. When using EMFAC2017-PL, emissions rates are estimated based on user-specified, project-specific conditions. An updated handbook for using EMFAC2017 at the project level is available from CARB at:

<https://www.arb.ca.gov/msei/downloads/emfac2017-volume-ii-pl-handbook.pdf>. EMFAC2017 allows users to run one model for SIP inventories, regional emissions analyses, and project analyses.

B. What Analyses Can EMFAC2017 Be Used for?

The EPA is approving the model to estimate regional emissions of HC, CO, NO_x, PM₁₀, PM_{2.5}, and sulfur oxides.³ However, EMFAC2017 will only be used in transportation conformity for pollutants and precursors that are transportation-related emissions, e.g., HC, CO, NO_x, PM₁₀ and PM_{2.5}.

The EPA is also approving EMFAC2017 to estimate CO, PM₁₀ and PM_{2.5} emissions for conformity hot-spot analyses involving individual transportation projects. A hot-spot analysis is defined in 40 CFR 93.101 as an estimation of likely future

³ The EPA notes that EMFAC2017 can be used for CO₂ emissions analyses as well, but there are no SIP or transportation conformity requirements for greenhouse gases (GHGs). In addition, although SO₂ is listed as a potential precursor for PM_{2.5} formation in 40 CFR 93.102(b)(2)(v), this precursor has not been considered significant for the on-road mobile sources covered by transportation conformity in California to date.

localized pollutant concentrations and a comparison of those concentrations to the relevant NAAQS. This analysis is conducted on a smaller scale than a nonattainment or maintenance area, e.g., for a congested roadway intersection. Hot-spot analyses are completed for only certain types of transportation projects; see 40 CFR 93.123(a) and (b) for further information.

The EPA also notes that today's approval action does not affect the methodology required for calculating re-entrained road dust for PM₁₀ and PM_{2.5} SIPs and transportation conformity analyses. Estimates for PM₁₀ and PM_{2.5} in EMFAC2017 do not include such emissions. When applicable, PM₁₀ and PM_{2.5} nonattainment and maintenance areas are required to use the EPA's AP-42 road dust method for calculating road dust emissions, unless a local method is approved in advance by the EPA.⁴ In addition, EMFAC2017 does not estimate ammonia emissions. Air quality and transportation agencies should contact the EPA Regional Office if ammonia emissions estimates are needed for SIPs or regional conformity emissions analyses.

⁴ For further information, see the EPA's February 4, 2011 Notice of Availability for the January 2011 AP-42 Method for Estimating Re-entrained Road Dust from Paved Roads (76 FR 6328). Also, for using AP-42 for unpaved roads, see the EPA's August 2, 2007 memorandum, "Policy Guidance on the Use of the November 1, 2006, Update to AP-42 for Re-entrained Road Dust for SIP Development and Transportation Conformity."

C. Why Does the EPA Consider EMFAC2017 to Be a Major Update to EMFAC?

EMFAC2017 includes new data and significant changes to the methodologies regarding calculation of motor vehicle emissions and revisions to implementation data for control measures. EMFAC2017 includes updated emissions factors and data on car and truck activities, and emissions reductions associated with new regulations supporting new estimates of emissions from heavy-heavy duty diesel trucks and buses.⁵ New emissions factor data was developed based on data from EPA's In-Use Vehicle Program, CARB's Vehicle and Truck and Bus Surveillance Programs, CARB's PEMS and Transit Bus testing and Integrated Bus Information Systems of West Virginia and Altoona. Motor vehicle fleet age, vehicle types and vehicle population have also been updated based on 2013-2016 California Department of Motor Vehicle (DMV) data, International Registration Plan (IRP) data, Truck Regulation Upload, Compliance, and Reporting System (TRUCRS) data, Port Vehicle Identification Number (VIN) data, California Highway Patrol School Bus Inspections and National Transit Database information. Each of these changes affect emissions

⁵ Regulations include the Federal Phase 2 Greenhouse Gas Standards, California Senate Bill 1 which impacts compliance assumptions in EMFAC2017 for CARB's Truck and Bus Regulation and Updates to CARB's Advanced Clean Cars regulations from CARB's 2017 Midterm review.

factors for each area in California. The EMFAC2017 model interface and overall design has not significantly changed as compared to EMFAC2014. CARB's web site describes these and other model changes at: <https://ww3.arb.ca.gov/msei/msei.htm>.

D. How Were Stakeholders and the Public Involved in the EMFAC Development Process?

Since 2017, CARB has held a series of public workshops to discuss emissions inventory updates and EMFAC updates and to receive comments on the resulting changes in the emissions inventory and models.⁶ CARB also conducted beta testing of interim versions of the model with air districts and Metropolitan Planning Organizations (MPOs). Stakeholders and other members of the public had the opportunity to request briefings with CARB staff and provide them with comments and suggestions to improve the model. CARB also developed and posted training modules for EMFAC2017 and supports a mobile source emissions inventory email listserv to announce updates and changes to the EMFAC supporting material.⁷

CARB also made available to the public a technical document that describes updates to the model and public presentations

⁶ See <http://www.arb.ca.gov/msei/workshop-meetings.htm>.

⁷ To subscribe to CARB's listserv for Mobile Source Emission Inventory development, see "Join our MSEI listserv" at https://www.arb.ca.gov/msei/categories.htm#onroad_motor_vehicles.

that summarize the changes from earlier versions of the model. The technical documentation and presentations are available on CARB's web site at: <https://www.arb.ca.gov/msei/categories.htm>.

Specific changes incorporated into the EMFAC2017 model are also discussed in

<https://www.arb.ca.gov/msei/downloads/emfac2017-volume-iii-technical-documentation.pdf>. All presentations from the public workshops are available on the CARB web site at:

<http://www.arb.ca.gov/msei/workshop-meetings.htm>.

E. Does this Notice Establish a Transportation Conformity Grace Period for the Use of this Model?

The transportation conformity rule (40 CFR 93.111) requires that conformity determinations be based on the latest motor vehicle emissions model approved by the EPA for SIP purposes for a state or area. Section 176(c)(1) of the CAA states that

" . . . [t]he determination of conformity shall be based on the most recent estimates of emissions, and such estimates shall be determined from the most recent population, employment, travel, and congestion estimates. . . ."

When the EPA approves and announces the availability of a new emissions model such as EMFAC2017, the EPA will consult with the U.S. Department of Transportation (DOT) to establish a grace

period before the model is required for conformity analyses (40 CFR 93.111(b)). The conformity rule provides for a grace period for new emissions models of between 3 and 24 months after notice of availability is published in the **Federal Register** (40 CFR 93.111(b)(1)).

The EPA articulated its intentions for establishing the length of a conformity grace period in the preamble to the 1993 transportation conformity rule (November 24, 1993, 58 FR 62211):

"EPA and DOT will consider extending the grace period if the effects of the new emissions model are so significant that previous SIP demonstrations of what emission levels are consistent with attainment would be substantially affected. In such cases, States should have an opportunity to revise their SIPs before MPOs must use the model's new emissions factors."

In consultation with the Federal Highway Administration (FHWA) and the Federal Transit Administration (FTA), the EPA considers "the degree of change in the model and the scope of re-planning likely to be necessary by MPOs in order to assure conformity" in establishing the length of the grace period (40 CFR 93.111(b)(2)).

Upon consideration of these factors, the EPA is establishing a two-year grace period before EMFAC2017 is required for all new HC, NO_x, PM₁₀, PM_{2.5} and CO regional

emissions analyses (e.g., supporting transportation plan and TIP conformity determinations).

The grace period for regional emissions analyses begins on **[INSERT DATE OF PUBLICATION IN THE *FEDERAL REGISTER*]** and ends on August 16, 2021. Areas have the option of using the new model for regional emissions analyses prior to the end of the grace period.

Upon consideration of the transportation conformity rule's factors, the EPA is also establishing a one-year grace period before EMFAC2017 is required in conformity analyses for all new CO, PM₁₀ and PM_{2.5} hot-spot analyses supporting project-level conformity determinations.

The grace period for hot-spot analyses begins on **[INSERT DATE OF PUBLICATION IN THE *FEDERAL REGISTER*]** and ends on August 17, 2020. Areas have the option of using the new model for hot-spot analyses prior to the end of the grace period.

As discussed earlier in the notice, EMFAC2017 incorporates significant changes to the emissions and vehicle fleet data assumptions used to estimate emissions for regional emissions analysis. In addition to incorporating the new EMFAC2017 emissions rate and fleet data, state and local agencies also need to consider how the model affects regional conformity analysis results and whether SIP and/or transportation plan/TIP

changes are necessary to assure future conformity determinations. As stated earlier in the notice, the changes to EMFAC affect emissions factors for each area in California. CARB has requested a 24-month grace period to allow them to update SIPs previously developed using EMFAC2011 or EMFAC2014 with the updated emissions from EMFAC2017. CARB anticipates that 24 months are needed to develop and submit revised SIPs based on EMFAC2017. The EPA agrees that additional time is necessary for CARB to revise previously approved SIPs with EMFAC2017 and complete the SIP revision process so that MPOs can incorporate revised SIP motor vehicle emission budgets ("budgets") into the transportation conformity process.

For application of EMFAC2017 at the project level, the application of EMFAC2017 and the model's overall design and interface are similar to EMFAC2014. As a result, project sponsors developing future hot-spot analyses for projects that require such analyses in CO and PM nonattainment and maintenance areas that have already used EMFAC2014 should not need significant time to familiarize themselves with this model.⁸ In addition, the fact that time may be needed for revising SIPs or transportation plans/TIPs due to the emissions factor changes in

⁸EPA is not providing new or updated hot-spot training or guidance for hot-spot analyses due to EMFAC2017.

EMFAC2017 is irrelevant for hot-spot analyses, because hot-spot analyses do not rely upon such planning documents. But while EMFAC2017's model design and interface has not significantly changed from EMFAC2014, project sponsors may still need some time to familiarize themselves with CARB's updated EMFAC2017-PL handbook and consider technical resource allocation issues to incorporate EMFAC2017 into any future hot-spot analyses in multiple CO, PM₁₀, and PM_{2.5} nonattainment and maintenance areas across California.

Therefore, it is appropriate to set a one-year grace period to allow all areas in California to incorporate EMFAC2017 in conformity hot-spot analyses for required project types and apply the updated planning assumptions incorporated in EMFAC2017 in a timely manner. In the interim, new PM and CO hot-spot analyses that are started prior to the end of the EMFAC2017 grace period can be based on (40 CFR 93.111(c)).⁹

When the regional emissions analysis grace period ends on August 16, 2021, EMFAC2017 will become the only approved motor vehicle emissions model for all new regional transportation conformity analyses in California for meeting the requirement to use the latest emissions information in conformity analyses. In

⁹See webpage <http://www3.epa.gov/otaq/stateresources/transconf/projectlevel-hotspot.htm#pm-hotspot> for latest guidance documents and information.

general, this means that all new HC, NO_x, PM₁₀, PM_{2.5}, and CO regional conformity analyses started after the end of the two-year grace period must be based on EMFAC2017, even if the SIP is based on an earlier version of the EMFAC model.

In addition, in most cases, if an area revises previously approved EMFAC2014-based SIP budgets using EMFAC2017, the revised EMFAC2017 budgets would be used for conformity purposes once the EPA approves the SIP revision. In general, the EPA will not make adequacy findings for these SIPs because submitted SIPs cannot supersede approved budgets until they are approved. However, 40 CFR 93.118(e)(1) allows an approved budget to be replaced by an adequate budget if the EPA's approval of the initial budgets specifies that the budgets being approved may be replaced in the future by new adequate budgets. This flexibility has been used in limited situations in the past, such as during the transition from EMFAC7F and EMFAC7G to EMFAC2002.¹⁰ In such cases, the EMFAC2017-based budgets would be used for conformity purposes once they have been found adequate. California air agencies should consult with the EPA as needed to determine if this flexibility applies.

¹⁰ See 67 FR 46618 (July 16, 2002); 67 FR 69139 (November 15, 2002); and 68 FR 15720 (April 1, 2003).

When the hot-spot analysis grace period ends on August 17, 2020, EMFAC2017 will become the only approved motor vehicle emissions model for all new hot-spot transportation conformity analyses for required project types across California for meeting the requirement to use the latest emissions information in conformity. In general, this means that all new CO, PM₁₀, and PM_{2.5} hot-spot analyses started after the end of the one-year grace period must be based on EMFAC2017 rather than EMFAC2014.

F. Can Areas Use EMFAC2014 During the Grace Period?

The conformity rule provides some flexibility for regional emissions analyses that are started before the end of the grace period. Analyses that begin before or during the grace period may continue to rely on EMFAC2014. The inter-agency consultation process should be used if it is unclear if an EMFAC2014-based analysis was begun before the end of the 24-month grace period. When the grace period ends, EMFAC2017 will become the EPA-approved motor vehicle emissions model for regional emissions analyses for transportation conformity in California.

CO, PM₁₀, and PM_{2.5} hot-spot analyses for project-level conformity determinations can be based on EMFAC2014 if the analysis was begun before the end of the 12-month grace period, and if the final environmental document for the project is issued no more than three years after the issuance of the draft

environmental document.¹¹ Quantitative analysis already underway that was started before the end of the grace period using EMFAC2014 can be completed as long as 40 CFR 93.111(c) is satisfied. The inter-agency consultation process should be used if it is unclear whether an EMFAC2014-based analysis is covered by the circumstances described in the transportation conformity rule.

G. Future Updates to EMFAC

¹¹ 40 CFR 93.111(c).

On January 31, 2006, CARB submitted a letter to the EPA and to the California Division of the FHWA indicating the State's intention to make future revisions to update EMFAC. These EMFAC updates would reflect, among other new information, updated vehicle fleet data every three years. In California, MPOs and Air Districts cannot update vehicle fleet data embedded into EMFAC, only CARB can update the fleet data with each new EMFAC update because of the model design. The EPA's July 2004 final rule (69 FR 40004) states that new vehicle registration data must be used when it is available prior to the start of new conformity analyses and that states and MPOs are strongly encouraged to update the data at least every five years as described in guidance issued December 2008 by the EPA and DOT.¹² CARB's next update to the planning assumptions in EMFAC is expected in 2020.

III. Summary of EPA Actions

As described in this notice, the EPA is approving and announcing the availability of EMFAC2017 as submitted by CARB on July 20, 2018 with the following limitations and conditions:

- (1) The approval is limited to California,

¹² For more information on qualitative PM hot-spot analyses, see the EPA and DOT's joint "Guidance for The Use of Latest Planning Assumptions in Transportation Conformity Determinations" (EPA420-B-08-901, December 2008).

- (2) The approval is Statewide and applies to estimation of emissions of HC, CO, NO_x, PM₁₀, PM_{2.5}, and sulfur oxides. In addition, EMFAC2017 will be used in transportation conformity regional emissions analyses for pollutants and precursors that are applicable in a given nonattainment or maintenance area. The EPA is approving the emissions factor elements of EMFAC2017, but not the associated default travel activity (e.g. Vehicle Miles Traveled).
- (3) A 24-month statewide transportation conformity regional grace period will be established beginning [**INSERT DATE OF PUBLICATION IN THE *FEDERAL REGISTER***] and ending August 16, 2021 for the transportation conformity uses described in (2) above.
- (4) The EPA is also approving EMFAC2017's Emission Rate Mode that allows the model to estimate project-level emissions for CO, PM₁₀, and PM_{2.5} conformity hot-spot analyses.
- (5) A 12-month statewide transportation conformity hot-spot grace period will be established beginning [**INSERT DATE OF PUBLICATION IN THE *FEDERAL REGISTER***] and ending August 17, 2020 for the transportation conformity uses described in (4) above.

Dated: August 6, 2019.

Michael Stoker,
Regional Administrator,
EPA Region IX.

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